

What is claimed is:

1. In an fuel cell control system for controlling a fuel cell stack constructed by a plurality of individual cells each of which generates an electric power by an electrochemical reaction of hydrogen and oxygen, comprising:
  - output voltage measuring means for measuring output voltages of all or a part of said individual cells; and
  - diagnosing means for diagnosing said fuel cell stack on the basis of the measured output voltages and their statistics.
2. The fuel cell control system according to claim 1, wherein said statistics include an average and standard deviation of said measured output voltages.
3. The fuel cell control system according to claim 2, wherein said diagnosing means diagnoses that the hydrogen electrode is blocked by water, if said average voltage is within a prescribed range and moreover at least one of said measured output voltages is not within a prescribed range.
4. The fuel cell control system according to claim 2, wherein said diagnosing means diagnoses that the electrolyte film is dried, if said average voltage is not within a prescribed range and moreover said standard deviation is within a prescribed range.
5. The fuel cell control system according to claim 2, wherein said diagnosing means diagnoses that the hydrogen supply is insufficient, if said average voltage is not within a prescribed range and moreover said standard

deviation is not within a prescribed range.

6. The fuel cell control system according to claim 1, wherein said measured output voltages are traced in time.

7. The fuel cell according to claim 6, wherein each  
5 traced measured output voltage is decomposed into a vibrating component and non-vibrating component.

8. The fuel cell control system according to claim 6, wherein said diagnosing means diagnoses that the water supply becomes excessive, if said non-vibrating component  
10 becomes decreased and moreover said vibrating component is within a prescribed range.

9. The fuel cell control system according to claim 6, wherein said diagnosing means diagnoses that the electrolyte film becomes dried, if said non-vibrating  
15 component becomes decreased and moreover said vibrating component is not within a prescribed range.

10. The fuel cell control system according to claim 6, wherein said diagnosing means diagnoses that the hydrogen supply becomes insufficient, if said non-vibrating  
20 component becomes decreased and moreover a speed drop of said non-vibrating component is greater than a prescribed speed.

11. The fuel cell control system according to claim 1, which further comprises temperature measuring means for  
25 measuring temperatures of all or a part of individual cells, wherein said diagnosing means diagnoses said fuel cell stack on the basis of statistically estimated output voltages Vesh, Vesl of the highest temperature individual cell and

lowest temperature individual cell, respectively.

12. The fuel cell control system according to claim 11,  
wherein said diagnosing means diagnoses that the water  
supply is excessive, if the output voltage  $V_{tmin}$  of said  
5 lowest temperature individual cell is lower than the output  
voltage  $V_{tmax}$  of said highest temperature individual cell  
and moreover  $V_{tmin}$  is smaller than  $V_{esl}$  defined when  
said water supply is reasonable.

13. The fuel cell control system according to claim 11,  
10 wherein said diagnosing means diagnoses that the water  
supply is insufficient, if the output voltage  $V_{tmax}$  of said  
highest temperature individual cell is lower than the  
output voltage  $V_{tmin}$  of said lowest temperature individual  
cell and moreover  $V_{tmax}$  is smaller than  $V_{esh}$  defined  
15 when said water supply is reasonable.

14. The fuel cell control system according to claim 11,  
wherein said highest and lowest temperature individual  
cells are selected among those which are provided with said  
temperature measuring means.

20 15. The fuel cell control system according to claim 11,  
wherein said highest and lowest temperature individual  
cells are selected by an interpolation on the basis of  
measures temperatures of said part of said individual cells.

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